

PREDICTED CASSINI PLASMA SPECTROMETER (CAPS) MEASUREMENTS DURING TITAN FLYBYS

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The Cassini Plasma Spectrometer (CAPS) is comprised of three sensors, the electron spectrometer (ELS), the ion beam spectrometer (IBS) and the ion mass spectrometer (IMS). The instrument is capable of characterizing the plasma density, velocity, and composition of Saturn's magnetosphere during the four years of the orbiting of Saturn by the Cassini spacecraft. The instrument is "flown" through a model of the Saturn magnetosphere to predict the expected CAPS response during a typical Cassini Titan flyby, using instrument parameters determined in laboratory calibrations. The model is the result of a 3D multiscale simulation describing the interaction of Saturn's magnetosphere with Titan's upper atmosphere and exosphere for a typical case when Titan is inside the Saturnian magnetosphere. The effects of a conducting ionosphere, exospheric mass loading, and ion-neutral charge-exchange are taken into consideration. The plasma flow parameters (density, temperature, and velocity) determined from these predicted measurements will then be compared with the original model inputs.